

# Knight® Precision Wire... Carbon Steel

## Product Information

### Technical Information

Due to the low cost, designers often examine carbon steels before considering any other material, as they have a range of attractive properties, particularly good formability (mild steels) and high hardness, plus excellent fatigue strengths (high carbon spring steels). Carbon steels are generally used in undemanding environments or are plated before or after forming to enhance corrosion protection.

Knight Precision Wire carries extensive stocks of carbon steel which can be broadly split into two categories:

- **Mild Steels** with a carbon content of less than 0.18%.
- **High Carbon Spring Steels** with a carbon content ranging from 0.35% for normal duty applications to 1.00% (music wire) for service where both static and dynamic stresses are very high.

### Low Carbon Mild Steels

Mild steels cannot be hardened except by cold working because their carbon content is too low for significant heat treatment to take place. However they are useful for general engineering purposes and available in a range of tempers.

#### Grade Designations & Chemical Composition (% by weight)

Material Grade BS 1052 : 1980	C (max)	Mn	S (max)	P (max)
	0.18	0.4 - 1.0	0.050	0.050

#### Mechanical Properties

Temper	Tensile Strength (N/mm <sup>2</sup> )
Annealed	500 max
Lightly Drawn	400-550
Hard Drawn	500-950

### High Carbon Spring Steels

As previously mentioned, these steels range in carbon content from 0.35% to 1.00% and, depending on the position within this range, the microstructure will be mixed ferrite/pearlite or completely pearlitic. However, for the severe cold drawing operations required to produce high tensile wire, coarse pearlitic structures are unsuitable, so patenting or controlled cooling of the rod coil is employed to ensure a fine structure.

#### Grade Designations & Chemical Composition (% by weight)

Material Grade BS 5216 : 1991	C	Si (max)	Mn	S (max)	P (max)
NS and HS	0.35 - 0.85	0.35	0.40 - 1.00	0.05	0.05
ND and HD	0.45 - 0.85	0.35	0.30 - 1.00	0.03	0.03
M	0.60 - 1.00	0.35	0.25 - 0.75	0.03	0.03

<b>Codes:</b>	NS : Normal duty static
	HS : High duty static
	ND : Normal duty dynamic
	HD : High duty dynamic
	M : High duty static and dynamic (music grade)

#### Mechanical Properties

The tensile strength of cold drawn carbon steel spring wire varies according to wire diameter. For actual values for a given size, please consult BS 5216 : 1991 entitled "Patented cold drawn steel wire for mechanical springs".

Courtesy of N. T. Legge Limited

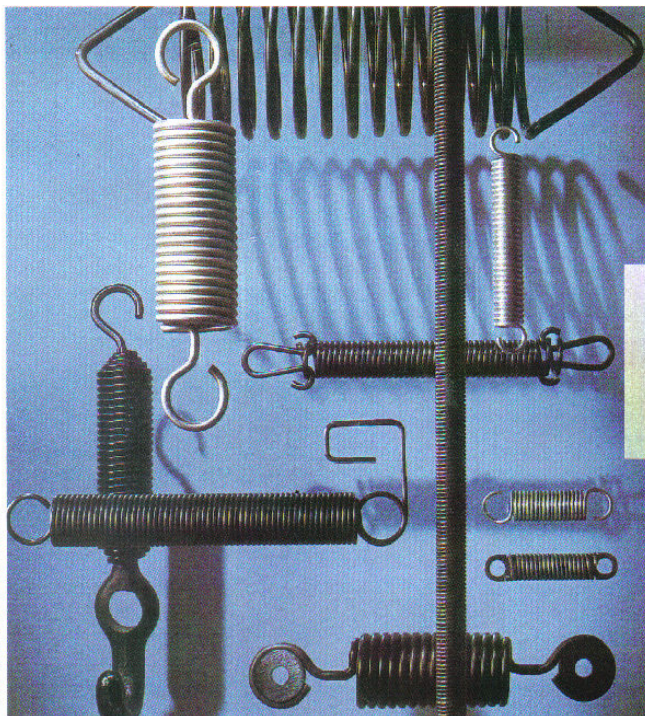
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BS 1052 SERVICE PROPERTIES		APPLICATIONS
Mild Steel	Low tensile strength, good formability.	WIRE BASKETS, FLORIST WIRE, COAT HANGERS
BS 5216 SERVICE PROPERTIES		APPLICATIONS
NS	For static applications with low stress levels.	MAGAZINE BINDING WIRES, STAPLES
HS	For static applications and moderately high stress levels.	TYRE CORD REINFORCEMENT
ND	Average fatigue resistance.	CIRCLIPS, WIRE ROPE, LOCK LEVERS
HD	Good fatigue resistance.	HELICAL SPRINGS, COMPRESSION SPRINGS
M	High tensile strength, smooth surface finish.	SMALL SPRINGS, PIANO STRINGS, CUTTING WIRES

CARBON STEEL STOCK RANGE		
GRADE	DIAMETER (mm)	
	Min	Max
<b>BS 1052</b>		
Mild Steel	0.50	10.00
<b>BS 5216</b>		
NS and HS	0.15	8.00
ND and HD	0.15	8.00
M	0.15	4.00

*For our full product range and processing capability, please see Section PW01.*



Courtesy of Kato Entex Limited

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